MULTIPOLARITY AND U.S. NUCLEAR STRATEGY

Workshop Summary

Center for Global Security Research
LAWRENCE LIVERMORE NATIONAL LABORATORY

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Prepared By: Lauren Borja, Jacek Durkalec,
Anna Péczeli, and Brian Radzinsky[1]

On December 7-9, 2021, the Center for Global Security Research (CGSR) at Lawrence Livermore National Laboratory (LLNL) hosted a workshop titled "Multipolarity and U.S. Nuclear Strategy." This session was CGSR's 8th Annual Deterrence Workshop, bringing together participants drawn across the policy, military, and technical communities of the United States and its allies. The workshop examined the implications of the emerging multipolar security environment to U.S. nuclear strategy, with special attention paid to the question of the two-peer problem and how the United States and its allies should address tripolar arms race risks.

Discussion was guided by the following key questions:

- What are the main features of the emerging multipolar security environment?
- What new problems does multipolarity present for deterrence, assurance, and strategic stability?
- Do these factors compel a fundamental re-making of U.S. nuclear strategy and posture, or something less?

Key take-aways:

1. From the perspective of U.S. nuclear strategy, the main features of the emerging multipolar security environment are the following:
   - Russia seeks to destroy the existing European security order and to accelerate the arrival of a "polycentric" global order with a much-reduced American role. It has extensively prepared for conflict with the United States and its allies, including with significant all-domain capabilities.
   - China seeks to replace the existing Indo-Pacific order with something promising greater deference to China's interests and to accelerate the arrival of a more multipolar world order with China in the central place. It too has extensively prepared for conflict with the United States and its allies and partners, including with all-domain escalatory capabilities.

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Understanding the requirements of deterring a modernizing China is essential to understanding deterrence in the new multipolar environment.

- Cooperation between Russia and China is evident. Collusion should be anticipated in crisis and war. Alliance at U.S. expense might yet become possible.
- In North Korea and Iran, the United States and its allies also face two deeply hostile regional states, one nuclear-armed and the other nuclear-arming.
- The principal new danger in this environment arises from the fact that the U.S. has the military means sufficient for only one major conventional war. When and if it mobilizes for such a war, there will be temptation for other adversaries and challengers to seize the moment to gain new advantages. This is the danger of opportunistic aggression.
- Allies are increasingly anxious about the potential for opportunistic aggression at their expense and the risk that the United States will be distracted elsewhere.

2. An additional feature of the emerging security environment is its unpredictability and the potential for "surprises," whether geopolitical or technological. There are new questions today about how emerging and disruptive technologies will reshape military balances and impact strategic stability.

3. There appears to be a rising discussion within and among potential U.S. adversaries about the willingness of the United States to defend its interests and allies; there is certainly more probing behavior aimed at testing that resolve. Allies are increasingly anxious that the U.S. commitment to its alliances is much weaker than they have understood and thus quietly discuss how to better hedge against the sudden collapse of those alliances.

4. Nuclear multipolarity also adds to the challenges of strategic stability. Crisis stability will be significantly affected by the fact that nuclear mobilization by one major power is almost certain to result in mobilization by the other two. Arms race stability will be significantly affected by triangular multi-domain offense/defense competition.

5. Nuclear multipolarity also raises new questions about whether the theory and practice of deterrence by the United States remain sound. In a world of multiple potential adversaries, some tailoring of approach is necessary given variance in what they value and how much risk they are willing to accept. The role of nuclear weapons is primarily to affect that risk calculus.

6. The United States must prepare potential responses for the types of wars it might have to fight in a more multipolar world. In scenarios involving two simultaneous regional wars, an adversary might employ a small number of nuclear weapons to damage U.S. power projection and cripple U.S. political resolve with relatively low lethality. In such scenarios, a very rapid U.S. response might not be necessary or desirable. Additionally, a response that is proportionate in damage done may not be sufficient to break the will of the adversary to continue to wage nuclear war if that adversary had calculated that the cost of a reciprocal response could be born and was worth paying for some gain.

7. An important new question relates to extended deterrence. Russia, China, and North Korea are all growing and improving theater nuclear forces, while also gaining confidence in the deterrence effects of their strategic forces. The response from worried allies has been clear:

rising doubts about the will and ability of the United States to extend nuclear deterrence on their behalf and rising demands for something better. In contrast, the U.S. nuclear community by-and-large treats extended deterrence as an afterthought. This suggests a clear mismatch between the requirements of a changing world, the urgency felt by many U.S. allies, a clear mismatch in U.S. theater capabilities, and a lethargic U.S. response.

8. The more multipolar nuclear security environment also raises a question about how to hedge. The current U.S. approach addresses the potential for three kinds of surprise: geopolitical (e.g., a sudden political realignment leading to a new adversary), technical (e.g., a crippling problem with existing warheads or delivery systems), and technological (e.g., a military application of a new technology that generates new nuclear requirements for the United States). In a more multipolar world, the potential for geopolitical and technological surprise is increased, and restoration of the status quo ante may not suffice. The United States can plausibly anticipate the kinds of "surprises" that might come its way in the years ahead, decide which risks it is willing to accept, and try to mitigate the rest. This requires a standing capacity to rapidly design, certify, and build the weapons needed to meet potential new nuclear requirements. Mitigation strategies have an additional value: they signal U.S. resolve to ensure the effectiveness of its deterrent at a time when this is in some doubt.

9. Multipolarity also has important consequences for political and diplomatic strategies to reduce nuclear and other strategic dangers. The factors that gave a central role to formal arms control mechanisms in the Cold War do not exist today and appear even less likely in the future if and as rivalry and competition intensify. Informal mechanisms and political agreements can play roles in reducing the dangers of rivalry and the costs of competition. They are likely, however, only in a new context of shared perceptions of common and unacceptable risks—either presented in an abstract context that will take shape only through substantive, sustained, high-level dialogue or demonstrated in a concrete context in a geopolitical crisis. Time will tell if dialogue proves possible. In the meantime, each competitor must consider how to compete without generating unhelpful second- and third-order effects. A simple arms race is not in evidence. But some increased coupling of decision-making about future force design is in evidence, as the U.S. faces decisions about the future of its non-nuclear strategic capabilities. Expect debates about how much unilateral restraint by the United States is enough—and too much.

10. These many questions do not add up to a requirement for a fundamental re-making of U.S. nuclear deterrence strategy and posture. But they do imply that we are entering a much more dynamic period for U.S. nuclear policy. The United States will face many decisions that both allies and adversaries will see as tests of U.S. resolve and competence as a nuclear guarantor. Faced with such moments, the United States is poised to again discover the costs of post-Cold War strategic atrophy, which it continues to unable to redress despite the many wake-up calls over the past several years.

Panel 1: Getting the China Factor Right

- How has China prepared for modern strategic conflict, nuclear and otherwise?
- What are its metrics for a "lean and effective" nuclear deterrent? Does it seek to be a nuclear peer to the US?
- What implications follow for U.S. nuclear strategy (broadly, not just nuclear deterrence)?

Chinese military strategists view modern warfare as a confrontation between rival systems-of-systems. Assuming that an objective cannot be achieved without conflict, China's approach to warfighting is to use its integrated military to disrupt and destroy the warfighting systems of its adversaries. Western experts have termed this approach "systems destruction" or "systems confrontation" warfare. Historically, Chinese strategists believed that nuclear weapons had little military utility because of their destructiveness compared to conventional weapons, especially precision strike weapons. Their role in China's approach to warfare was therefore relegated to strategic and political functions. Within the modern systems confrontation framework, nuclear weapons serve several additional roles—to deter and break attempts at nuclear coercion of China, to respond to nuclear attacks and deter further nuclear attacks, and to control escalation by disincentivizing wars over existential stakes.

Consequently, the principal metric for China's nuclear deterrent remains assured retaliation, understood as the ability to engage in nuclear retaliation even after nuclear attack. China's dramatically expanded silo-based missile force makes sense within this framework as doubling down on assured retaliation, increasing assurances that some of China's intercontinental-range forces will survive a first strike and offer a range of retaliatory options.

Several factors appear to be driving the increase in China's nuclear forces. China still feels threatened by trends in U.S. missile defense capabilities, and the location of China's new silos suggests a desire to base nuclear forces outside of the range of precision conventional strike capabilities. However, there is also evidence that China's nuclear thinking is becoming more multi-faceted even while remaining within the framework of assured retaliation. Some strategists now speak of restoring deterrence after the nuclear threshold has been crossed, which implies a desire to add more "rungs" to the "escalation ladder" and retain access to a variety of capabilities even after a first strike. There may also be internal bureaucratic drivers to China's nuclear expansion, including a desire by the nuclear components of China's military to improve their standing and technological sophistication relative to the conventional forces. Nevertheless, there is still evidence that Chinese strategists seek to avoid the excesses of the U.S.-Soviet Cold War arms competition.

The continued emphasis on opacity and ambiguity in Chinese strategic thought, particularly nuclear thought, obscures when China might exhaust its appetite for assured retaliatory capabilities. Several recent developments seem puzzling, including the decision to introduce a multiple-warhead variant of the first-generation DF-5B ICBM and to invest heavily in silos. The tradition of opacity and ambiguity also suggests that some of China's new silos may be equipped with decoys, at least in the short term. This would be consistent with a desire to frustrate efforts

by outsiders to understand China's nuclear capabilities and fine-tune assessments and response options.

China also does not appear to be motivated by a desire to attain quantitative parity with the United States, although it appears to be converging on a yet-unstated concept of qualitative parity. However, if Chinese strategic thought is undergoing evolution, a greater emphasis on quantitative equivalence or even superiority may emerge. The path of Chinese equivalence or superiority is more limited by political intent than fiscal or technological capabilities.

This dynamism makes it difficult to identify clear implications for U.S. nuclear strategy at this stage. There appears to be a clear asymmetry in regional nuclear capabilities that could complicate U.S. deterrence efforts in Asia. China's new higher precision, nuclear-capable, theater-range missiles pose new threats to US allies and introduces the possibility that China could engage in limited first use. More broadly, China's investments in a range of missile forces have created a situation in which the United States must invest comparatively more effort to counter Chinese developments. U.S. bombers must transit great distances and forego conventional strike missiles to carry out nuclear operations against China while China does not face comparable time or tradeoffs. China itself may not recognize the challenges that its nuclear modernization has created for the United States and may therefore be unprepared for the eventual response, potentially exacerbating strains in the U.S.-China nuclear relationship.

Panel 2: Re-Thinking the Russia Factor

- What factors are likely to guide the further development of Russian nuclear strategy and forces in the decade ahead?
- What are Russia's metrics for nuclear sufficiency?
- Does U.S. nuclear strategy properly account for these factors? If not, what should change?

One of the main drivers of Russian nuclear strategy and forces is the Russian leadership's assessment of the strategic balance. In the years ahead, the Russian military will continue to focus on modernization, and the role of nuclear weapons will continue to evolve as new systems are deployed. Strategic nuclear forces are still the centerpiece of their military strategy, but non-strategic nuclear weapons also play an important role as they are considered a cost-effective tool in theater operations. The Russian nuclear modernization effort is now in its late stages, and a key question is how political decisions and resources will shape the phase of Russian nuclear capability development.

At the same time, the Russian leadership also believes that they need to stay ahead in all weapons systems, not just nuclear. Russia has an asymmetric approach to mitigating vulnerabilities, and the leadership is determined to compete in all facets of military strategy. As nuclear modernization is nearly complete, Russia could put greater emphasis on asymmetric capabilities to win the battle in the information space. Some of the new exotic capabilities that Russia introduced in the past few years are meant to be a response to U.S. missile defense

developments, and these capabilities indeed give Russia a better ability to overwhelm, penetrate, or circumvent U.S. defenses. While maintaining credible nuclear forces remains imperative, non-nuclear strategic forces have already taken over some roles that used to be specific to nuclear weapons.

China so far has not appeared as a driver of Russian modernization efforts—this, however, might change in the future. President Putin is intent on convincing the United States that there are no issues between the Russian and Chinese leaders.

Russia's definition of nuclear sufficiency is closely attached to its concept of escalation control, which directly influences their force design. Russia has a strategy for escalation management spanning from peacetime operations all the way to nuclear war. Their toolkit includes the whole spectrum of non-military and non-nuclear capabilities that work in tandem with strategic military forces. They seek to dissuade, intimidate, or achieve de-escalation at key phases of conflict by being able to threaten or inflict unacceptable damage to the adversaries. Starting from the 1990s, Russia has developed tailored damage concepts specific to an adversary and a scenario. The goal is to dose out a certain amount of damage that will convince adversary leaders that continuing the conflict is simply not worth the costs. Psychological factors play an important role in the Russian strategy of escalation management.

A different way to look at sufficiency is through numbers and production capability. In this regard, Russia has some issues. Europe is a target-dense environment with many bases, military targets, and critical nodes that create a prioritization challenge for Moscow. Russia has a problem in producing sufficient capabilities to hold everything at risk; there are limitations in munitions, and even limitations in platforms. Russia has been trying to increase production and buy more advanced capabilities, but they do not have access to certain key components. Waging a war on Europe is very complex and expensive, which is why Russia has invested in redesigning its force and operations to be more credible and effective.

These efforts include improving precision and investing in innovation. The Russian military debates the benefits of countervalue vs. counterforce targeting. While countervalue targeting could create confusion and chaos in adversary populations, there is a trade-off in the ambiguity of the result. It is difficult to measure the secondary effects of such an attack (for instance, how it would affect the mentality of people), and Russian military thinkers are not confident in accepting the ambiguity and uncertainty of these effects. They are more confident in calculating the primary effects of attacking a purely military target. In this regard, non-strategic nuclear weapons are a crucial component of effectiveness since conventional capabilities simply cannot achieve the same effects against hardened military targets nor are they cost-effective. For Russia, it is a pure numbers game: as long as one or two non-strategic nuclear weapons can achieve with certainty the same intended military effects as dozens of air-launched cruise missiles, nuclear options are preferable. Many new systems are under consideration, driven by the need to neutralize certain weapons in the U.S. military arsenal—conventional prompt global strike and missile defense stand out in this regard.

One of the most important implications for U.S. nuclear strategy is the need to invest more time and energy into thinking about conventional-nuclear integration and war aims. The goal should

be to weaken Russia's confidence in their ability to manage escalation, and the United States and its allies need to be ready to fight across the whole spectrum of conflict. In addition, the United States should be more clear about its priorities and red lines.

Regarding long-term trends, Russia perceives that the United States is in decline and they welcome the shift towards a more multipolar world. Russia is confident in its ability to navigate this environment and compete in modern technologies to become a thought leader. However, they are still concerned about NATO operations and assistance in the post-Soviet space, and they are also worried about the health of the Russian economy. In terms of human capital, their biggest challenge is the absence of international collaboration and the lack of access to the expert community. Due to existing sanctions, cooperating with Russian entities remains dangerous for Western experts. While Russia is trying to gain leadership in areas like AI, they have a brain-drain problem and a lack of technologically savvy people.

Panel 3: Keeping an Eye on the Evolving "Rogue State" Threat

- How is the DPRK nuclear force likely to further develop over the decade ahead?
- What new challenges will a more robust DPRK nuclear force pose to extended deterrence and assurance?
- Would U.S. nuclear strategy have to further evolve if Iran crosses the nuclear threshold?

Even though the near-term U.S. focus is on peer competitors, continued attention is needed on the so-called rogue states, North Korea and Iran. Both countries have become more dangerous in recent years, and previous attempts to shift attention away from rogue states have failed. For example, the 2012 pivot to Asia failed because it was premised on less attention to the Middle East and less commitment to NATO allies. In practice, the opposite was needed after the rise of ISIS and Russia's annexation of Crimea. Even though U.S. attention mostly remains focused on great power competition, both countries can impact U.S. security in several ways: 1) Iran can constrain attempts to rebalance U.S. regional posture, 2) North Korea can limit U.S. military freedom of action in the Pacific theatre, and 3) both could increase the threat to the U.S. homeland through missile strikes—although right now it is assessed Iran would need about 18-24 months to mature its nuclear and missile capabilities. Furthermore, the United States faces an additional challenge because addressing the threats from both Iran and North Korea may extend beyond the role of any single combatant command.

Both Iran and North Korea have built up their missile and nuclear weapon capabilities. North Korea has built ballistic missiles capable of reaching the U.S. homeland with a nuclear weapon, which could increase the lethality of conflict on the Korean peninsula. In the meantime, Iran has built the largest missile force in the Middle East and remains poised at the cusp of nuclear breakout. At the moment these rogue states do not necessitate a change to the U.S. nuclear posture; this largely depends on the path the two countries choose to take with their missile and nuclear forces in the future. A rogue state gaining the ability to threaten the U.S. homeland is a key threshold. However, the assessed effectiveness of U.S. missile defenses will play a key role in

how the United States ultimately responds. In the case of North Korea, there are many unknowns around its nuclear posture, which complicates the development of a deterrence relationship and makes it more difficult to identify the goals the United States should pursue with the country.

Changes to the security environment caused by rogue states threaten U.S. extended deterrence commitments. Many allies in both Asia and the Middle East are unhappy with the North Korean and Iranian missile build up. Pauses on longer-range ballistic missile testing, seen as most desired by American interests, do little to assuage allies' fears of shorter-range capabilities. As a result, many allies are requesting more help from the United States for regional defenses or developing and deploying their own regional missile defenses. In the Pacific, some allies, such as South Korea, may be willing to test U.S. commitment to non-proliferation by entertaining debates on developing their own nuclear options, whereas such discussion was largely considered taboo in the past. Other allies, such as Japan, are pursuing strike options or requesting stronger assurances from the United States in light of North Korean nuclear developments.

These considerations must be addressed in U.S. national security strategy and future war planning. Key to this is understanding how multiple adversaries, including those at the rogue state level, could cooperate to work against the United States in a future conflict. While a comprehensive four-war strategy may seem appealing, today the United States lacks the resources for such a strategy. Instead, the United States should identify synergies across homeland missile defense and its strategies around conventional and nuclear forces to address potential scenarios involving single adversaries or multiple adversaries. The United States needs to build capabilities to strengthen deterrence, enable power projection, and if needed, limit damage in a war. Missile defense will play an important role in this, especially in protecting the U.S. homeland, military bases abroad, and allies. These defenses should be built in a layered approach that spans from non-kinetic to kinetic, left-of-launch to beyond. A more balanced approach is needed to the missile defense conversation because even modest defenses have benefits if they are employed in the right way.

Panel 4: Thinking Through the Two-Peer Problem: Allied Perspectives

- Which scenarios are most concerning?
- What new burdens do adversary strategies place on extended deterrence?
- To what extent can U.S. allies do more for deterrence beyond trying to ensure a favorable balance of conventional forces?

For the U.S. allies in Europe and the Indo-Pacific, a two-peer problem raises questions about the credibility of U.S. extended deterrence, in particular the U.S. ability to meet its commitments in one region while engaging in a crisis or war in the second theater.

NATO has recently woken up to the challenge by recognizing direct and indirect challenges to the Alliance posed by China. However, the problem of dealing with the implications of U.S.

actions in Asia for Euro-Atlantic security is not entirely new. European allies have Cold War experiences of dealing with the consequences of U.S. military operations in Asia. For example, the Alliance's early institutional and force posture development was influenced by the U.S. engagement in the Korean War. Similarly, the Vietnam War triggered U.S. withdrawals from Europe, handicapping allies' ability to implement the strategy of flexible response. NATO thinking about nuclear deterrence in the Cold War was also shaped by nuclear crises in Asia.

The Cold War experience is, however, largely forgotten. It is also only partially applicable to the current context. This is because the two-peer problem has some novel features that create uniquely new challenges for deterrence and assurance. In particular, because of China's quantitative and qualitative military buildup, for the first time in history the United States will face two nuclear peers. Strategic stability between the United States and Russia and China cannot be assured. The nuclear dynamics are also changing in the context of shifting conventional balances and the unclear impact of emerging and disruptive technologies on the tripolar deterrence relationship.

In the Indo-Pacific, in particular in Japan, the recognition of the two-peer problem is prompted by increasingly visible political and military cooperation between China and Russia. This cooperation is becoming more evident with the close relationship between Xi and Putin and the joint military activities in the Indo-Pacific, including air and maritime patrols. Closer ties between China and Russia are forcing Japan to reassess the previous assumptions that driven Japanese approach to Russia, which presumed that Russia and China are splitable, and that economic incentives could encourage Moscow to choose Tokyo over Beijing and to resolve long-standing Russian-Japanese territorial disputes.

Several concerning scenarios are raised by closer Russia-China alignment. The first one is a two-front crisis in which Russia and China make simultaneous or subsequent, in concert or from opportunity, moves to remake regional orders to their own designs. As Russia may take an opportunistic advantage of a crisis in the Taiwan Strait caused by China, Beijing may take an advantage of a Russia-orchestrated crisis in Ukraine. Second, either Russia or China may choose to directly test the robustness of U.S. extended deterrence. Actions in one region can impact deterrence and assurance in the other region and will have much greater repercussions than a Russian or Chinese aggression against non-U.S. allies. Third, there are many potential cross-domain and cross-regional implications of a conflict in one region. For example, U.S. space assets targeted by China during a regional conflict in the Asia-Pacific would become unusable to support deterrence and warfighting requirements in Europe. Fourth, the lack of clarity about the extent of Russian and Chinese technological cooperation raises questions about how far this cooperation could go, and how it might proliferate to third countries, including North Korea. Last but not least, a scenario that cannot be discounted is a catalytic aggression in which either Russia or China covertly raises tensions in the other region in order to have a greater freedom to pursue strategic objectives in their own region. In other words, Putin might want to take advantage of Xi's involvement in a conflict with the United States, and Xi might want to take similar advantage on Putin.

U.S. allies recognize the resource allocation problems of the United States created by the two near-peer problem. While they tend to worry about the negative effects of the failure of

extended deterrence in the other region, they are primarily worried that the U.S. engagement elsewhere would negatively impact the U.S. ability to deter threats in their own region. The resource allocation problem is thus a conceptual, intellectual, and diplomatic problem related to the limited U.S. strategic bandwidth.

The two-peer problem also raises questions about the credibility of U.S. extended nuclear deterrence. First, what if the United States is unable to quantitatively and qualitatively keep up with the future nuclear deployments of Russia and China? Will U.S. allies care? What will reassure them in such circumstances? On the one hand, effective nuclear deterrence does not require overwhelming superiority or even a parity with an adversary. Even quantitatively or quantitatively inferior forces might be sufficient for deterrence. American allies can learn how to live in a strategic environment in which the United States is no longer "second to none." On the other hand, U.S. inferiority vis-à-vis China and Russia might become a problem if it is perceived as part of a systemic decline. What also may create anxiety in allies is how the perceived inferiority might impact the U.S. resolve to take nuclear risks on their behalf, especially in scenarios of war over limited objectives that may be of great strategic importance to U.S. allies and of little importance to the United States.

The second question is whether nuclear weapons could help to deter aggression or manage escalation in a scenario in which the United States and its allies do not enjoy conventional regional superiority because of the U.S. military engagement in another region. As every crisis between nuclear powers is by definition a nuclear crisis, nuclear weapons could be leveraged by the United States and its allies to shape decisions of an opportunistic aggressor. Yet, this may be difficult in a scenario in which Russia or China also enjoy regional nuclear superiority with diverse arsenals of non-strategic nuclear forces. In such a scenario, adversary's theater nuclear forces might negate any perceived benefits that the United States and its allies might want to enjoy from putting nuclear weapons to the forefront.

Allied investments in non-nuclear systems are seen as a major contribution they can make to alleviate the U.S. burden of having to deter two-peers at the same time. This includes allies' investments in long-range precision strike capabilities, missile defense systems, space assets, as well as offensive cyber capabilities. In recent years, the United States became more open to facilitate such investments with more openness to military capability and technology transfers. European nuclear allies might also take some burden from U.S. extended deterrence in Europe, or they could play such a role in the Asia-Pacific context. Allies could also contribute to mutual space resiliency. For example, during a conflict in Europe Japan's space assets could provide back up to U.S. systems and European owned assets, and vice versa.

American regional allies may also contribute to integrating conversations about deterrence requirements in Europe and the Asia-Pacific. Separation of the two regions makes things more complicated and fails to address the global approach of Russia and China. U.S. allies can do more to convince adversaries that they cannot contain a crisis solely to one region and achieve their objectives through limited means. Allies should also contribute to new thinking on deterrence in the 21st century. As the Cold War deterrence debates were to a great extent shaped by U.S. allies, it should be the case today.

Panel 5: Thinking Through the Two-Peer Problem: U.S. Perspectives

- Which scenarios are most concerning?
- What are U.S. options for managing the associated risks?
- How should allied interests inform U.S. choice?

For the United States, the most concerning scenario created by the two-peer problem is a simultaneous regional war with Russia and China. To some extent this is a China-derived problem, as the Chinese conventional buildup provides Beijing more leeway for opportunism. Once the U.S. is tied down elsewhere, the level of China's mischief that the United States can tolerate is likely to go up. This may embolden Beijing to more provocation that may escalate to a conflict. The coupling of Chinese regional conventional parity or even dominance over the United States with a nuclear buildup may embolden China even more. The reason is that the current U.S. nuclear advantage constraints China's room for maneuver. But if China believes that it can reduce nuclear risks from the United States, it can have greater risk tolerance for conventional aggression.

Any U.S. regional war against China and Russia may lead to nuclear escalation. Therefore, a two-peer problem is also a problem of whether the United States has a sound strategy and sufficient forces to restore deterrence in scenarios in which a two-front regional war escalates to a nuclear level. This might theoretically include three scenarios: 1) a scenario in which the United States may be forced to resort to limited nuclear use against one or two adversaries; 2) a scenario in which the United States conducts a limited nuclear use against one adversary while being in a general nuclear war with another adversary; and 3) a scenario of a general nuclear war with two adversaries.

The United States has sufficient forces to execute its flexible and tailored strategy of limited nuclear use against one or two adversaries. This strategy is a strategy to restore deterrence with the least amount of destruction on the best possible terms. This is not a strategy of nuclear dominance and does not require matching all the capabilities of Russia and China. This is also not a strategy of minimum deterrence. The success of this strategy depends on graduate strike options with a variety of systems and yields to support theater campaigns.

The U.S. ability to restore deterrence is much more problematic in the two other scenarios. In case of a general nuclear war with only a single adversary and a limited war with another one, could the United States keep in reserve sufficient retaliatory forces to inflict unacceptable damage upon the second adversary should that conflict escalate as well? In case of a general nuclear war against two adversaries, would the United States be able to credibly threaten unacceptable damage against two of them after suffering large-scale attacks against its nuclear forces, nuclear command and control, and other military and non-military targets? In such a scenario, some portion of the U.S. ICBM, SSBN, and strategic bomber force would be destroyed. The availability of nuclear options could also be limited by the cyber and counter-space operations of adversaries. Targeting objectives would be also uncertain as after initial attack it would be unclear which of the nuclear forces of adversaries could be employed. In both

scenarios, the level of sufficient forces would depend on the definition of unacceptable damage. The United States might be also forced to fall back to a minimum deterrence threat.

The United States has several options to prepare to deter the whole spectrum of threats associated with the two near-peer problem. Primarily, U.S. nuclear strategy against Russia and China should support the overall U.S. strategies to deal with these two rivals. As the two competitors are highlighting the importance of their nuclear weapons, the United States should listen and avoid the corrosive effects of the disconnect between its overall strategy and the nuclear element. The next Nuclear Posture Review (NPR) should account for the radical changes in Chinese nuclear posture. The world of 2021 is neither the 2010 world nor the 2018 world in which the two previous NPRs were prepared. In particular, Chinese nuclear expansion raises questions about the U.S. hedging strategy.

While the U.S. nuclear rhetoric may shift relatively quickly, capabilities cannot. Strengthening the long-term credibility of the U.S. strategic forces to deter against the most extreme scenarios might require additional upload capability, maintaining warm production lines for warheads and delivery vehicles, improving the survivability of current systems by air and missile defenses, adjusting alert levels and dispersing bombers as well as SSBNs and NC3 (nuclear command, control and communications). There might also be a need for rethinking the relationship between warning alert status and operational deployments. The United States should also increase its resilience to non-kinetic strikes against NC3 and critical infrastructure. There is a limited role for nuclear weapons in deterring such threats. Adversaries are also unlikely to use nuclear weapons against such targets located in the U.S. homeland without exhausting other options.

Even if U.S. nuclear forces may be sufficient to maintain central deterrence in the context of the two near peer problem, this might not be enough for maintaining credible extended nuclear deterrence. As the U.S. nuclear advantage fades along with conventional dominance, allies may reconsider their options of whether to counter-balance adversaries together with the United States or bandwagon. For the success of U.S. strategy against China, the United States cannot afford allied hedging.

What may reassure allies is U.S. conventional capabilities that can deal with two competitors simultaneously. The alternative is accepting risk. Nuclear weapons cannot do much to offset any conventional disadvantage. If the U.S. is engaged in a large-scale conventional war in one region, it seems unlikely that it will be willing to use nuclear weapons in the other one.

The role of strategic forces in regional scenarios might also be limited apart from casting a nuclear shadow. The only exception might be strategic bombers and the W76-2 which provides a low yield option to restore deterrence at the lowest level.

The key to maintain credible extended nuclear deterrence against two nuclear peers is maintaining credible and flexible regional options. This requires upholding and implementing the decision to develop new nuclear sea-launched cruise missiles. Preventing the erosion of U.S. extended nuclear deterrence and adjustment to China’s nuclear rise may require additional steps. This may include land-based intermediate-range systems or air-launched nuclear cruise

missiles for dual-capable aircraft. Yet, all these options are currently highly unlikely. New regional command and control structures and new forward deployments of U.S. nuclear capabilities, particularly in Asia, seem more achievable yet still problematic.

Panel 6: (Re)-Setting the Nuclear Hedge

- Is the nuclear hedge well tailored for the existing and projected security environment?
- If, in response to China's build up, steps are taken to deploy some reserve warheads from the hedge, what should be done to re-set the hedge? Should the U.S. simply replenish the reserve with additional life-extended weapons or do something different?
- What are the next potential developments in the security environment that might warrant future changes to deployed and/or hedge forces?

The nuclear hedge consists of the U.S. stockpile of non-deployed warheads and bombs and a responsive design and production. The hedge is a phenomenon of the post-Cold War era. In keeping with the absence of major nuclear-armed rivals and a desire to lead the way in nuclear reductions, U.S. nuclear weapons design labs and production facilities shifted focus from producing new warheads to maintaining the existing stockpile for as long as necessary.

The hedge aims to mitigate two sources of risk: major geopolitical shifts and major technical failures affecting U.S. weapons. It does so by maintaining reserve warheads at varying states of readiness, allowing the United States to increase the numbers of deployed weapons to respond to a significant shift in the security environment. Reserve warheads hedge against technical failures by providing the ability to replace a defective warhead design with another design compatible with the defective warhead's delivery system.

U.S. nuclear hedge strategy has to this point been largely successful. The stockpile stewardship program has produced high confidence in the performance of U.S. nuclear weapons (without nuclear testing) while dramatically enhancing understanding of why and how nuclear weapons work. More recent initiatives, such as the Stockpile Responsiveness Program, have attempted to sustain nuclear weapons design skills amid generational turnover in the technical workforce. A reconstituted ability to produce plutonium pits would also contribute to U.S. hedging strategy, although the current production infrastructure is not adequate to meet future needs. Concerns also persist about eroding human capital.

More broadly, U.S. hedge strategy is premised on two assumptions that may limit the strategy's applicability to the current security environment. First, the hedge assumes that the United States can mitigate geopolitical risk through increases in the size of deployed forces. Some risks, such as China's ongoing nuclear expansion, could be addressed through an increase in deployed warheads, although a quantitative solution may not be the only or best response. Second, current hedge strategy assumes that the future geopolitical and technological environments will be evolutions of the present environment. That is, despite the hedge's stated goal of hedging against unanticipated future developments, the hedge is optimized to respond to foreseeable contingencies—a shortfall in meeting U.S. targeting requirements or a technical challenge within

one leg of the nuclear triad. Other risks, such as a novel threat to nuclear command and control or the stealth of U.S. ballistic missile submarines, cannot be mitigated with changes in deployed warhead numbers.

China's multi-faceted nuclear expansion therefore poses several challenges to U.S. hedging strategy. The United States has three options for responding to China's buildup. The first is to do nothing. This would entail either acceptance of the risks posed by a larger Chinese force or other approaches to mitigating these risks. The second is to invoke the stated purpose of the nuclear hedge and adapt U.S. nuclear posture to ensure that STRATCOM can continue to meet presidential employment guidance in the context of a larger Chinese arsenal. This could necessitate "resetting" the hedge through increasing the size of the active reserve stockpile. This response would represent a ratification of the existing U.S. approach to deterring China. The assumption underlying this response is that China's basic approach to nuclear strategy remains unchanged despite the expansion of its arsenal. This response also assumes that the U.S. approach to deterring China does not require adaptation. Conversely, a third response to China's buildup would be to revisit U.S. nuclear strategy, doctrine, and employment policy to identify whether changes are necessary to achieve deterrence in the context of the changed security environment, one in which the United States faces two nuclear peers or near-peers, and one in which China's own nuclear strategy and posture is dynamic. Beyond offering a short-term means to signal U.S. resolve and assure allies, U.S. hedge strategy offers little in the way of capabilities or responsiveness to support this option.

Contending with fundamental uncertainty in the future security and technological environment will require significantly greater responsiveness. This will require changing the way the United States currently approaches the nuclear stockpile, which is largely aimed at reconstituting legacy capabilities and skills. Hedging strategy will also likely have to adapt to the new strategic environment and the deeply multi-domain character of modern warfare. In this environment, threats to nuclear deterrence can arise from developments outside the nuclear domain, and conversely, nuclear weapons may be called upon in the future to respond to multi-domain threats. In the absence of clear potential solutions to future challenges, solutions may have to be devised and fielded quickly to hedge future risks.

Panel 7: Calibrating Tripolar Arms Race Risks

- What action-reaction cycles are evident today? How tightly coupled are they?
- Might they become more tightly coupled in the future? How? Why? Or why not?
- How might it be possible to reduce unwanted risks?

The risks of tightly coupled action-reaction cycles are often overstated. Several issues are frequently mentioned as action-reaction cycles in the arms control debate, such as coupling between missile defenses and new missile technologies or the sizes of countries nuclear arsenals. However, the historical record supports other arguments for arms build ups. For example, fiscal tradeoffs, bureaucratic rivalries, and domestic factors often constrain arsenal

build up. These considerations have been observed in many nuclear-armed states, including the United States.

Several factors could lead to a tighter coupling of arms racing in the future. The return to great power competition, where nuclear states are increasingly focused on each other, could lead to several of the great powers increasing the number of their nuclear weapons. At the non-strategic level, there is little risk of arms racing, but build-ups could still be destabilizing, especially within the regional context. A build-up in strategic forces could lead to a similar build-up in other countries, which would put further pressure on others. The United States might face a pressure to participate in an arms race to demonstrate resolve against revisionist states. To escape these spiraling dynamics, the United States may seek to change its overall strategy from defense of the free world to self-sufficiency, but this would be a mistake.

Much of the risk comes down to assessing the degree to which China and Russia are coupled. It is unclear to what degree Russia and China are coupled, either directly or as a secondary response to the United States. The two have claimed to not be discussing this, but it is unfathomable that their militaries would not take the other into account in their planning. China's growing arsenal also complicates matters, and any potential U.S. response must consider many of these concerns.

Diplomacy could be used to reduce these multipolar risks, but many uncertainties remain. There is a bipartisan consensus in the United States that it is possible to maintain deterrence or even gain advantage using arms control, as was done in the Cold War. This will be much more complicated in the current environment, as both deterrence and gaining advantage through arms control measures become more complex in a multipolar environment. U.S. allies, especially those in Europe, look first and foremost to use diplomacy to maintain the status quo. One option for doing this is to develop a shared commitment to strategic stability amongst Russia, China, and the United States. The United States should continue to modernize its arsenal, while also investigating ways to reduce nuclear forces with Russia.

Secondly, new technologies could be a source of stability, although they may also increase risks. Much of the literature around emerging technologies focuses on the risks technology poses and its potential to undermine stability, but this is only part of the story. New technologies may give rise to a new source of mutual stabilizing vulnerability, one that would be similar but different to mutual nuclear vulnerability. The threat to second-strike forces from big data and sensing could be an important part of this vulnerability. On the other hand, the role of new technologies in regional dynamics, where much of the threat to current strategic stability lies, is much less clear. It might depend on which state or actor ultimately controls the technology. For instance, it might be stabilizing if the United States possesses a certain technology, but much less so if a new technology emboldens Russia or China in a regional context.

Panel 8: Lessons Learned and Implications

- Is a fundamental re-making of U.S. nuclear policy or posture necessary today?
- What should the U.S. do to adapt its nuclear strategy to multipolarity?

There are three main features of the security environment that could guide the re-making of U.S. nuclear policy. The first feature is uncertainty. While the new deterrence challenges have become more familiar to the U.S. strategic community and adversary strategies are more or less understood, significant sources of uncertainty remain for the decades ahead. There is an increased potential for strategic surprise that may arise from geopolitical factors or growing technological complexity.

The second feature is multipolarity. The problem for U.S. nuclear posture "comes in four." While deterrence and defense discussions need to focus on Russia and China as the two nuclear peers that could wage a war against the United States and its allies simultaneously, not enough attention is paid to the challenge of the DPRK and Iran. The U.S. strategic community should focus more on what it would mean to fight a nuclear war in the Korean Peninsula, and what kind of deterrence challenges and force requirements rogue states create.

The third feature is the failure to look inward. The United States tends to look at the world and describe the challenges without looking into the mirror to see how it is responsible for the problems. Adversaries look at the United States as a major adversary, and also as a declining power—these diverse views of the United States make them very unpredictable. In addition, both adversaries and allies question the U.S. willingness to come to the defense of allies and fight for its interests in remote areas.

This environment presents many new problems. The credibility of assurances is not a new issue for the United States, but defending allies in a multi-domain and multipolar world creates a distinctly new set of challenges that have not been present before. This new environment burdened by technological complexity also complicates strategic stability by adding new areas of competition that undermine arms race stability and crisis stability. The United States also needs to account for two major powers at the same time. Even in case of a regional crisis with only one nuclear peer, it is likely that there would be three-way force generation which creates very dangerous escalation dynamics. While arms racing for nuclear supremacy is unlikely, increased coupling of decision making about future force design is already visible. Despite adversary accusations, the United States is not competing with Russia or China in missile defense, instead the rogue state problem remains the primary driver of these developments. The United States has shown a great degree of restraint in both missile defense and also in conventional precision strike developments. Russia is not likely to change the calculus for the United States, but China has put new questions ahead for U.S. force modernization.

The growing uncertainties also present new deterrence challenges. The most prominent new problem is deterring opportunistic action in the second theater. It is very likely that while the United States is tied down in a regional crisis with a major adversary, the other nuclear peer could use the opportunity to advance its own military goals and push for a quick fait accompli.

Trying to deter such opportunistic action might result in the failure of military campaign in the first theater, and if the second theater escalates, the United States could face double failure. In order to avoid such an outcome, the United States needs to understand how deterrence could fail in the first theater, and what allies can do to fill the gaps. The second deterrence issue is extended deterrence. It used to be a footnote in U.S. deterrence strategy, yet it is increasingly more important in regional wars against nuclear peers.

While the two-peer problem is not new, the United States is now in the third phase of thinking about this issue. The recognition of the two-peer problem started under the Obama administration. Under the Trump era, the U.S. strategic community embraced this challenge and highlighted great power competition in the National Defense Strategy. Many new requirements emerged from that recognition. This is now the third phase of thinking through this question, and the alarming expansion of Chinese nuclear forces has awakened even more people to the problem. Decision makers are finally taking notice of this issue, and commanders are asking how to operationalize deterrence theory. The first opportunity to answer these questions is going to be the Biden administration's Nuclear Posture Review, but as this problem is probably only getting worse, perceptions of a new window of vulnerability could emerge for years to come.

In light of all of the above, is there a need for a fundamental re-making of U.S. nuclear posture? Nuclear strategy has many dimensions. It is clear that nuclear arms control has arrived at a crossroads where it either adapts or dies. The U.S. strategy of hedging also needs to be revisited: the big question is whether keeping warm production lines needs to be a part of the hedge. As the future of the stockpile is completely uncertain, the best course of action for the United States is to refocus on fundamental R&D to understand what capability requirements could emerge in the future and how that would impact deterrence. Right now, nobody identified the need for a new capability, but this could change. It is imperative to figure out how to speed up the U.S. response to strategic surprise, which is not just an infrastructure, but also a political requirement.

Despite the growing uncertainties in the security environment, the deterrence fundamentals are not changed: it remains important to tailor deterrence strategy to different adversaries, the United States still wants to comply with the Laws of Armed Conflict in military operations, integrating conventional and nuclear capabilities is still crucial, and the need to have credible capabilities that deter an attack by adversaries is also unchanged.

What has changed is the more substantial role of extended nuclear deterrence. In the most likely scenarios of regional great power war, an effective warfighting capability will be key to win. Forces that were designed in the 1990s are not suited for the current environment. This more multipolar world creates new force requirements for the United States and its allies. An important element of effective warfighting is a modernized and up-to-date alliance structure that would also require from the United States a modification of the regional command and control structures. Allies are increasingly anxious about the U.S. will and capability to defend them, and they would see changes in U.S. nuclear posture very concerning. Keeping them engaged and understanding their concerns has to be a priority for the United States, otherwise there could be a backlash. In order to maintain deterrence effectiveness in both theaters, the

United States should also be more clear about the new capability requirements that allies need to contribute.

All of the above suggests that there is no reason for a fundamental re-making of the posture, but a new take is probably needed on some capabilities.

Center for Global Security Research
Lawrence Livermore National Laboratory
P.O. Box 808, L-189 Livermore, California 94551
https://CGSR.llnl.gov

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